DETAILED ACTION

1. Applicant's election without traverse of species II in the reply filed on 1/11/08 is acknowledged.

Drawings

2. The drawings are objected to because Figure 4 is not drawn into 4 separate figures labeled as Figure 4(a), Figure 4(b), Figure 4(c), and Figure 4(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 5, 7, 23, 27, and 29 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Fujimaki (JP405180917 A). Fujimaki discloses the same invention as claimed. See Figure 7(B).

5. Claims 36-38, and 41 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Fujimaki (JP405180917 A). The prior art inherently possesses the limitation "wherein the first nominal plane and the second nominal plane … from background magnetic fields." If the Applicant disagrees with this assessment, then it is a matter of design choice to make the first and second nominal plane sufficiently apart to allow the pick-up loops to distinguish local magnetic fields from background ones. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Fujimaki (JP405180917 A) as a matter of design choice to make the first and second nominal plane sufficiently apart in order to allow the pick-up loops to distinguish local magnetic fields from background ones for performance maximization purposes.

Allowable Subject Matter

6. Claim 50 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Bot LeDynh whose telephone number is 5712722231. The Examiner normally does not work on Fridays. The examiner can normally be reached on Maxiflex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, PATRICK J. ASSOUAD can be reached on (571)272-2210. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BL/ 2008

/Bot LeDynh/
Bot LeDynh, J.D., D.A., Ph.D.
Primary Examiner
Art Unit 2862

The Examiner would like to attach the following computer translation of some portions of the applied reference Fujimaki (JP405180917 A) for Applicant's convenience.

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* NOTICES *

JPO and INPIT are not responsible for any
damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]This invention relates to the superconductivity pick up coil linked to SQUID (Superconducting Quantum Interference Device superconducting quantum interference device) used for biomagnetic measurement etc.
[0002]Sensitivity of SQUID being high and measuring the magnetism of living body produced from a brain, the heart, etc. is widely used as a high sensitivity magnetic sensor. Especially the above-mentioned biomagnetic measurement has played the role important for medical diagnosis, a functional break through of a living body, etc.
The design of the superconductivity pick up coil for arranging near the surface of a human body, or arranging on both sides of some human bodies, and measuring is important in order to change a magnetic field under test into an electrical signal faithfully efficiently, and to distort this electrical signal to SQUID or to transmit without a loss.

[0003]
[Description of the Prior Art]Since magnetism of living body has a very low level as compared with environmental magnetism, such as magnetism generated from the geomagnetism which changes under the influence of a solar wind etc., or an electric apparatus, measurement is faced it from the former, Measure within the magnetic shield room sealed with the wall of the high magnetic body of initial permeability, such as a permalloy, and also as the pick up coil for detecting magnetism, It considers offsetting the influence of environmental magnetism and detecting only the space inclination of a magnetic field under test using what connected two or more coil portions to the opposite direction to magnetism.
[0004]When measuring magnetism of living body, the flat-surface type pick up coil which obtains the spatial differentiation of the tangential direction of a body surface corresponding to the purpose of measurement or the shape of a measured subject, and the solid type pick up coil which obtains the spatial differentiation of the perpendicular direction of a body surface have been suitably used from the former.
[0005]Drawing 6 (A) - (C) and drawing 7 (A) - (C) is an outline composition explanatory view of the conventional superconductivity pick up coil. in this figure -- 41 -- as for a superconducting coil portion and 45, a superconductivity line and 43 are [a silicon substrate and 47] polyimide films a superconductivity round trip path cord and 46 SQUID and 44 a bobbin and 42.
[0006]Drawing 6 (A) twists the superconductivity line 42 around the bobbin 41, forms

two superconducting coil portions for reverse, and shows the composition of the solid type superconductivity pick up coil which connected this superconducting coil portion to SQUID43.
[0007]Drawing 6 (B) shows the composition of the flat-surface type inclination [primary] type superconductivity pick up coil which formed the superconducting coil portion 44 in the surface of the silicon substrate 46, connected these two superconducting coil portions 44 for reverse with the superconductivity round trip path cord, and was further connected to SQUID43.
[0008]Drawing 6 (C) forms two 1 turn superconducting coil portions 44 and one 2 turn superconducting coil portion 44 on the silicon substrate 46, and with the superconductivity round trip path cord 45. The composition of the flat-surface type inclination [secondary] type superconductivity pick up coil which connected the superconducting coil portion of 1 turn and the superconducting coil portion of 2 turns for reverse, and was further connected to SQUID43 is shown.
[0009]Drawing 7 (A) forms the superconductivity pattern for forming the superconductivity pattern and the superconductivity round trip path cord 45 for forming the superconducting coil portion 44 on the polyimide film 47 which has flexibility, Curve this polyimide film 47 cylindrical and the superconductivity pattern for forming the superconducting coil portion 44 is connected, The two superconducting coil portions 44 connected to the opposite direction are formed, and the composition of the solid type inclination [primary] type superconductivity pick up coil which connected this to SQUID43 further is shown.
[0010]Drawing 7 (B) forms the two superconducting coil portions 44 and superconductivity round trip path cords 45 with a superconducting thin film on the flexible polyimide film 47, The composition of the superconductivity pick up coil which connected the superconducting coil portion 44 to the opposite direction, and was further connected to SQUID43 with this superconductivity round trip path cord 45 is shown. In this example, since the polyimide film 46 is flexibility, the solid type inclination [primary] type superconductivity pick up coil according to the shape of the measured subject can be obtained.
[0011]Drawing 7 (C) forms the superconducting coil portion 44 on two non-flexibility boards of silicon substrate 46 grade, It connects with the superconductivity round trip path cord 45 in which between these two superconducting coils 44 was formed on the flexible film of polyimide film 47 grade, and the composition of the solid type inclination [primary] type superconductivity pick up coil linked to SQUID43 is shown further.
[0012]In the great portion of above-mentioned conventional technology, in order to improve the balance accuracy of space inclination, the superconducting thin film on a substrate was patterned with the lithography technology, and the superconductivity pick up coil was formed.
[0013]
[Problem(s) to be Solved by the Invention]However, if it is in the superconductivity pick up coil of these former, In advance of a design, it determines whether to use a coil portion as a flat-surface type, or use a solid type according to a measured subject, It was required to determine individually the distance on the vertical axis between

superconducting coil portions, i.e., base line length, and many cases were impossible for diverting the superconductivity pick up coil designed and manufactured for the specific measured subject to measurement of other measured subjects.
[0014]An object of this invention is to provide the superconductivity pick up coil which can choose after manufacture whether the flat-surface type superconductivity pick up coil is used or the solid type superconductivity pick up coil is used, or can change base line length easily.
[0015]
[Means for Solving the Problem]In the superconductivity pick up coil concerning this invention, To achieve the above objects, composition by which a superconductivity round trip path cord which moves in a zigzag direction by being connected to two or more superconducting coil portions and a superconducting coil portion of this plurality was formed on a flexible substrate, and a separation portion was formed in a flexible substrate between superconductivity round trip path cords which adjoin meanderingly was adopted.
[0016]
[Function]The superconductivity round trip path cord connected to two or more superconducting coil portions formed on the flexible substrate like this invention is made to move in a zigzag direction, If it cuts to the flexible substrate between the superconductivity round trip path cords which move in a zigzag direction and adjoin deeply and separation portions, such as a filmy slot and perforations, are formed in it, Arrangement between two or more superconducting coil portions can be freely adjusted by changing the flexible substrate which detaches this separation portion suitably and in which the superconductivity round trip path cord is formed after manufacture, Selection of whether the flat-surface type pick up coil is used or to use the solid type pick up coil or adjustment of base line length is attained.
[0017]
[Example]Hereafter, the example of this invention is described based on a drawing.
(The 1st example) Drawing 1 is an outline composition explanatory view of the superconductivity pick up coil of the 1st example of this invention. As for a square-shaped coil portion and 4, in this figure, a polyimide film and 2 are [a contact button and 6] separation portions a superconductivity round trip path cord and 5 a superconducting thin film pattern and 3 1.
[0018]The superconducting thin film pattern 2 which consists of the square-shaped coil portion 3 and the superconductivity round trip path cord 4 connected to this with a lithography technology etc. is formed on the existing flexible substrate 1, for example, a polyimide film.
[0019]In order to transmit to SQUID the electrical signal which connects between SQUID with the square-shaped coil portion 3, forms the closed loop, and is produced according to a measured magnetic field, this superconductivity round trip path cord 4, The electric conduction line of the superconductivity of the couple generated between the square-shaped coil portion 3 and the contact button 5 is pointed out, and it is meanderingly formed on the polyimide film 1 like a graphic display.
[0020]And it cuts to the polyimide film 1 between the superconductivity round trip path

cords 4 which adjoin meanderingly deeply, and the separation portions 6, such as a slot and perforations, are formed in it.
[0021]Drawing 2 (A) - (C) is an outline composition explanatory view of the superconductivity round trip path cord of one example of this invention. As for 11, in this figure, a superconductivity stripe and 15 are superconducting thin films a polyimide film, and 12, 13, 14, 16 and 17.
[0022]Drawing 2 (A) shows the composition of the superconductivity round trip path cord of a parallel 1 line type. In this path cord, the superconducting thin film formed on the polyimide film 11 is patterned with a lithography technology etc., the superconductivity round trip path cords 12 and 13 are formed, and a design and formation are the easiest.
[0023]Drawing 2 (B) shows the composition of the superconductivity round trip path cord of a micro stripe type. In this path cord, the superconductivity stripe 14 of one sections is formed in the upper surface of the polyimide film 11, and the superconducting thin film 15 is formed in a rear face.
[0024]Drawing 2 (C) shows the composition of the both-way path cord of a twist type. Influence is made hard to influence the environmental magnetic field of the external world in this path cord, by making the both-way path cords 16 and 17 cross at a proper interval, although the both-way path cords 16 and 17 of two sections are formed in the upper surface of the polyimide film 11.
[0025]Drawing 3 (A) and (B) is a directions-for-use explanatory view of the superconductivity pick up coil of one example of this invention. The numerals in this figure are the same as that of what 7 was SQUID, and also attached and explained the same sign in Drawing 1.
[0026]The directions shown in drawing 3 (A) have arranged the two square-shaped coils 3 on the same flat surface, separated the both-way path cord 4 following it by the separation portion 6, developed without separating the separation portion 6 of the polyimide film 1 between the square-shaped coils 3, and they are connected to SQUID7. By this directions method, the superconductivity pick up coil for flat-surface type space inclination measurement can be obtained.
[0027]The directions shown in drawing 3 (B) separated all the separation portions containing the separation portion 6 between the two square-shaped coils 3 formed on the polyimide film 1, have arranged the two square-shaped coils 3 in three dimensions, and have connected SQUID7 to the end of the both-way path cord 4 via the contact button 5.
[0028]According to these directions for use, the superconductivity pick up coil for solid type space inclination measurement can be obtained. Furthermore, the length of the shaft orientations of the square-shaped coil 3, i.e., base line length, is changeable according to this method suitably by changing the degree of modification of the polyimide film 1 according to measurement symmetry.
[0029](The 2nd example) Drawing 4 is an outline composition explanatory view of the superconductivity pick up coil of the 2nd example of this invention. As for a circular coil portion and 23, in this figure, 21 is [a contact button and 25] separation portions a both-way path cord and 24 a polyimide film and 22. In this figure, the both-way path

cord 23 is shown by the single solid line in order to make a drawing brief.
[0030]In the pick up coil of this example, the both-way path cord 23 which connects the contact button 24 with the two circular coil portions 22 and these two circular coil portions 22 is formed on the flexible polyimide film 21.
[0031]And this both-way path cord 23 comprises a portion of concentric circle shape, and a radial straight-line portion, and it is formed so that it may have the shape which moves in a zigzag direction.
[0032]And it cuts to the polyimide film 21 between the both-way path cords 23 which adjoin meanderingly deeply, and the separation portions 25, such as a slot and perforations, are formed in it. The directions for this example can obtain the superconductivity pick up coil for measuring flat-surface type space inclination or solid type space inclination by changing a separation portion for the separation polyimide film 21 suitably like the directions for the 1st example.
[0033](The 3rd example) Drawing 5 is an outline composition explanatory view of the superconductivity pick up coil of the 3rd example of this invention. As for a square-shaped coil and 33, in this figure, 31 is [a contact button and 35] separation portions a both-way path cord and 34 a polyimide film and 32.
[0034]This example is related with the composition of the two-dimensional inclination type superconductivity pick up coil. Although the manufacturing method and composition of this superconductivity pick up coil are the same as that of the 1st example almost, On the existing flexible substrate 31, for example, a polyimide film, if it explains briefly, two square-shaped coils of 1 turn and the one square-shaped coil 32 of 2 turns which consist of superconducting thin films, and the both-way path cord 33 which connects between these square-shaped coils 32 and contact buttons 34 are formed.
[0035]And this both-way path cord 33 is moved in a zigzag direction and formed on the polyimide film 31, and the separation portion 35 is formed in the polyimide film 1 between the both-way path cords 33 which adjoin meanderingly.
[0036]The directions for the pick up coil of this example are the same as that of the 1st example almost, The superconductivity pick up coil for measuring flat-surface type space inclination can be obtained by placing the three square-shaped coils 32 on the same flat surface, separating the both-way path cord 33 following it by the separation portion 35, elongating, and connecting with SQUID.
[0037]The superconductivity pick up coil for measuring solid type space inclination can be obtained by separating all the separation portions containing the separation portion between the three square-shaped coils 32 on the polyimide film 31, and arranging the three square-shaped coils 32 in three dimensions.
[0038]Furthermore, according to this method, the length of the shaft orientations of the square-shaped coil 32, i.e., base line length, is changeable suitably by changing the degree of modification of the polyimide film 31.
[0039]
[Effect of the Invention]As explained above, according to this invention, on a flexible substrate with a lithography technology etc. It can change into a flat-surface type and a solid type by forming separation portions, such as infeed, in the flexible substrate

between the both-way path cords which move in a zigzag direction, form the both-way path cord which connects the coil portion and this coil portion of a superconducting thin film, and adjoin meanderingly, and changing a flexible substrate in use. By changing the degree of modification of a flexible substrate, base line length can be changed and it can also double with the size of a measured subject. Therefore, the pick up coil of various shape can be obtained, without changing the mask pattern for lithography.

[Translation done.]

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/Bot LeDynh/
Bot LeDynh, J.D., D.A., Ph.D.
Primary Examiner
Art Unit 2862